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Research Note 79-16

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THE RELATIONSHIP BETWEEN LEADER PERSONALITY CHARACTERISTICS  
AND GROUP TASK PERFORMANCE

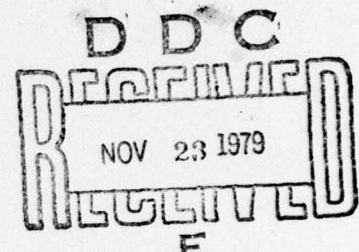
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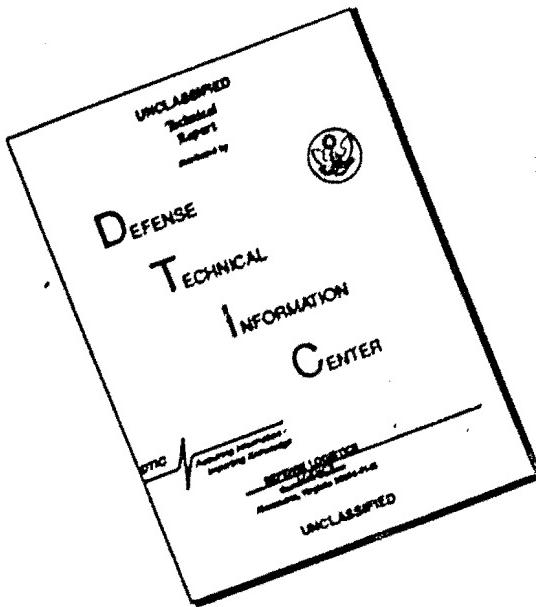
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20. ABSTRACT (Continue on reverse side if necessary and identify by block number) The revival of interest in personality characteristics of a leader that predict group task performance led us to examine the data sets of Projects Athena and Sentinel. We identified and factor analyzed 25 personality measures to yield a set of nine personality measures: leadership ability, attitudes toward women, verbal and math SAT, male- and female-valued qualities, locus of control, and self-concept. Male and female cadets led three-man groups in a structured and an unstructured task. Male leaders who rated themselves as low in feminine		

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20. ~~S~~ qualities led groups that performed well on the unstructured task. More task-oriented (low LPC) female leaders led successful groups in the same task. No personality correlates were found for the structured task.

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The Relationship Between Leader Personality Characteristics  
and Group Task Performance

In his historical review of research on leadership, Stogdill (1974) discusses the trait theory that dominated research from the period of World War I until the late 1940's. A wide variety of traits—physical, social background, intelligence and ability, and personality, social, and task orientations—were considered. The purpose of this research was to identify traits that differentiated leaders from nonleaders, and effective leaders from ineffective leaders. As Stogdill indicates, much of this research was successful in identifying such traits. However, follow-up research consistently showed that leader characteristics that were effective predictors in one setting were not reliable predictors in other situations. These discouraging results were a major factor in the shift to studying situational influences on the leadership process and measurement of the behavior, rather than the traits, of leaders.

Stogdill (1974) reports that recent research is beginning to revive an interest in leader characteristics. An article by Fiedler and Leister (1977) illustrates this renewed interest in leader characteristics. These authors have shown that the leader trait of intelligence is related to group performance, if the appropriate screening variables are identified and measured. A screening variable is a moderator variable. For example, Fiedler and Meuwese (1963) found that the correlation between leader intelligence and group performance was substantial only among groups with high cohesiveness.

The Project Sentinel data, collected at the United States Military Academy, also reflects this revival of interest in leader traits (Rice, Bender, & Vitters, 1977). The initial analyses of these data revealed some interesting effects of one particular personality characteristic of the leader, his or her Least Preferred Coworker (LPC) score (Fiedler, 1967). The LPC score is thought

to measure the orientation of the leader: a high LPC score indicates that a person is primarily concerned with the relationship functions of the group, while a low score is interpreted as indicating a primary concern with task success (see Rice, 1978, for a review of research supporting this interpretation). Rice et al. (1977) found that LPC was a reliable correlate of task performance for groups with both male and female leaders. However, the directions of the correlations between LPC and group performance were often opposite for the two sexes. Such results suggest that gender may serve as an important moderator of the relationship between leader traits and leader effectiveness. Given the success of these initial analyses of a single personality variable with the Project Sentinel data, other personality variables were identified from the Project Athena data set, and their potential relationships with group performance were explored. Several characteristics of the Project Athena data make them especially well suited for such analyses.

First, the Project Athena data set includes a substantial number of high quality measures of personality. This situation allows one to avoid the difficulties of over-reliance on a single predictor. With such a data set, one can meaningfully explore the predictive powers provided by combinations of such variables.

Second, the Project Athena data provide the means of avoiding difficulties in such analyses created by over-aggregating the data (i.e., combining subsamples that are distinct). In light of research by Fiedler and Leister (1976), it was decided to disaggregate the data and conduct separate analyses for male and female leaders in addition to conducting such analyses for the combined sample.

The use of two group performance measures in Project Sentinel is a third desirable property of these data for the type of analysis under discussion.

Groups of cadets performed both a structured task involving the reproduction of a scaled drawing, and an unstructured task in which cadets wrote a proposal for improving re-enlistment rates in their units. Stogdill (1974, p. 5) warns that "the trait theories of leadership do not tell us how and when the traits are most effective." The present study provides preliminary tests for the generalizability of any significant correlates of group performance by virtue of having two tasks. That is, we can examine correlates with performance on both tasks.

In summary, the purpose of the analyses reported here is to explore the traits of leaders as they relate to the group task performance. In addition to examining the zero-order correlations between these variables, we also considered leader's gender as a potential moderator (screen) of such relationships. Furthermore, by comparing such results for two different tasks, we are able to assess, in a preliminary manner, the generalizability of our findings across task situations.

#### Method

##### Subjects

The subjects were 36 men and 36 women freshmen cadets at the United States Military Academy at West Point. Each cadet led a group of three men, also freshmen cadets.

##### Procedure

Each three-man group worked on two experimental tasks. On the structured task, the group worked together to make a scale drawing of a building; performance on this task was assessed on the basis of the number of lines correctly placed on the drawing. The unstructured task required that the group write a proposal outlining ways for junior officers to maintain high standards and increase re-enlistment rates in their units. Raters assessed the originality,

practicality, and organization of the ideas expressed in the proposal. Following each task, all subjects responded to a questionnaire that included measures of perceived task success, leader behavior, morale, and performance attributions. For a more detailed description of the methods of this study, see Rice et al. (1977).

### Analyses

Overview. The purpose of these analyses is to examine the personality characteristics of a leader that may be related to his or her group's performance. A set of 25 personality variables, collected for Project Athena, were identified for each of the cadets leading a group in the Sentinel project. This set was unwieldy to use as predictors in regression equations, both because of its size and because several of the variables were second administrations of the same test and multicollinearity among predictor variables was high. To cope with this problem, we factor analyzed this set, reduced it to nine primary variables, and used those nine variables as predictors in regression analyses. The purpose of these regression analyses was to find those variables, or combination of variables, that predict leadership effectiveness, defined here as the group's performance on each of two tasks.

Factor analyses of the personality measures. The set of 25 personality variables was factor analyzed using a principle factors analysis with iterations and a varimax rotation. Five factors were identified, each having an eigenvalue greater than one (see Table 1). The first factor is defined by the Academy's

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Insert Table 1 about here  
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Leadership Evaluation System (LES) ratings of leadership ability for the first two semesters. Since MP101 and MP102 are composites of the other variables,

their unit weights were summed to give one general score of leadership ability, MP. The second factor was simply defined as cadets' responses to two administrations of the Attitudes toward Women Scale (AWS) of Spence and Helmreich (1972). To represent this factor, we selected their score on AWS, administered when they entered West Point (AWS211J). Factor III was created because social and task LPC are parts of the total LPC scale. The total LPC was used to represent this factor. The positive (SELF-CONCEPT) and negative (MALADJUST) parts of the Tennessee Self-Concept Scale loaded on the last two factors. Both measures were scored to reflect positive self-concept qualities at the high end of the scale. The sum of the unit weights (the score divided by its standard deviation) of these measures was used to create an overall measure of self-concept. Feminine and masculine self-image were defined as cadets' responses, at entrance to the Academy, to the female- (ANDRF) and male-valued (ANDRM) items, respectively, on the Personal Attributes Questionnaire (PAQ; Spence, Helmreich & Stapp, 1974). For a detailed discussion of each of these individual variables and their meaning, see Priest (1975) and Priest, Prince, and Vitters (1977).

Two other variables were added to our final set because they were interesting and unrelated to variables representing each of the five factors described above. These variables are intelligence, operationally defined as cadets' scores on the verbal and math parts of the Scholastic Aptitude Test (SAT), and locus of control as measured by the Rotter I-E scale (Rotter, 1966). Thus, our final set of nine predictor variables were: MP, AWS, total LPC, self-concept, female- and male-valued items on the PAQ, verbal and math SAT, and Rotter scores. Factor analyses, conducted separately for each sex, produced factors that paralleled the ones created by the combined data.

ResultsRegression Analyses

Two types of regression analyses, simple and stepwise, were conducted for each measure of performance. These tests were run using the entire set of 72 leaders, male leaders only ( $n = 36$ ) and female leaders only ( $n = 36$ ). Simple regression analysis enters all predictors into the regression equation simultaneously. For female leaders and all leaders combined, our set of nine predictors was not significantly related to performance on either the drawing or proposal tasks. However, the set of nine predictors was significantly related to the group's performance on the proposal task for male leaders and accounted for 53.3% of the variance in group performance on this task (see Table 2). The stepwise regression analyses further clarify this relationship.

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Insert Table 2 about here

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A stepwise regression analysis enters the variables singly and hierarchically, selecting each variable for entry at each of the nine steps by using the variable that is mathematically most predictive of the criterion. There were no significant effects in the stepwise regressions for all leaders or the female leaders on either task. For male leaders, female-valued items (ANDRF) and the composite of self-concept scores significantly accounted for 35.4% of the variance in performance on the proposal task. (The adjusted or shrunken  $R^2$ , which is an estimate of the population parameter, is .308.)

The statistical interpretation of this regression finding is that some linear combination of ANDRF and concept scores predict a significant proportion of the variance in performance on the proposal task. These variables were selected by the computer to be entered first into the regression equation.

## Leader personality characteristics

Because ANDRF was selected before concept, it is possible to look at the zero-order correlation between ANDRF and performance as an indicator of the strength of this particular variable's relationship to performance. Because concept was entered after ANDRF, ANDRF is controlled for in this relationship. Thus, it may be useful to examine the partial correlation of concept with performance controlling for ANDRF.

The zero-order correlation between leader ANDRF and group performance on the proposal task was  $-.48$  ( $n = 36$ ,  $p < .004$ ). This correlation indicates that male leaders using few valued female items to describe themselves on the PAQ had more productive groups on the proposal task than did leaders using many valued female items on the PAQ self descriptions. The partial correlation of self-concept with group performance on the proposal task, controlling for the effects of scores on the ANDRF scale, is insignificant ( $r (36) = .05$ , n.s.).

## Zero-order Correlates of Group Performance

In addition to providing a basis for interpreting the multiple regression results, the zero-order correlations of personality variables and group performance can be interesting in their own right. Separate correlations of this type for male and female leaders are presented in Table 3. As discussed above,

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Insert Table 3 about here

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male leaders of groups that scored high on the proposal task scored low in female-valued items on the PAQ. Women who led groups that scored high on the proposal task were those women who showed a task-orientation (low score) on the LPC scale ( $r (36) = -.30$ ,  $p < .06$ ). Assuming that task-orientation is a

traditionally masculine characteristic (cf. Deaux, 1976), these results suggest the hypothesis that in this setting, the more stereotypically masculine leaders, whether they be male or female, led successful groups on the proposal task.

#### Discussion

Unfortunately, the results of our efforts to predict group task performance on the basis of leader personality characteristics were quite consistent with the generally negative results of previous research along these lines. Even with the substantial number of such variables available in the Project Athena data set, we were not able to identify individual personality characteristics of the leader, or combinations of such characteristics, with much ability to predict task performance by the group. These rather negative conclusions hold for analyses of the entire sample and for separate analyses on male and female leaders.

The only exception to these negative findings concerns the degree to which leaders conform to a masculine stereotype. Two significant, or marginally significant, correlates of performance on the proposal task suggest that more stereotypically masculine leaders have more effective groups. Further research is needed to assess the appropriateness and generalizability of such an interpretation, both within and outside of a military environment.

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Factor Loadings for the First Five Factors

<u>Leadership Item</u>	<u>Attitudes toward Women</u>		<u>Least Preferred Coworker</u>		<u>Feminine Self-Image</u>		<u>Masculine Self-Image</u>	
	<u>Loading</u>	<u>Item</u>	<u>Loading</u>	<u>Item</u>	<u>Loading</u>	<u>Item</u>	<u>Loading</u>	<u>Item</u>
NP101	.96450	AWS211J	.96816	TOTAL LPC	.98877	ANDRF	.68214	ANDRM
NP102	.84608	AWS211L	.91616	SOCIAL LPC	.77929	PAQF	.76130	PAQM
COCSUM	.53383	RAVANS	.97397	TASK LPC	.70654	SELF-CONCEPT	.65692	SELF-CONCEPT
UFPEER1	.81584					MALADJUST	.56882	MALADJUST
OWNPER1	.82462							
TAC	.85565							
COCL	.71092							
UPPER2	.71744							
OWNPER2	.87258							
	Eigenvalue = 8.23					Eigenvalue = 2.37	Eigenvalue = 1.75	Eigenvalue = 1.10

Note: The variable name abbreviations used in this report conform to those used in previous U.S.M.A. Office of Institutional Research technical reports dealing with these variables.

Table 2  
Simple Regression Analyses  
Using the Nine Personality Variables

<u>Subjects</u>	<u>Task</u>	<u>R</u> <sup>2</sup>	<u>F</u>	<u>df</u>	<u>P</u>
All leaders	Drawing	.105	.68	9,52	n.s.
	Proposal	.144	.97	9,52	n.s.
Male leaders	Drawing	.112	.29	9,21	n.s.
	Proposal	.533	2.66	9,21	.031
Female leaders	Drawing	.258	.81	9,21	n.s.
	Proposal	.303	1.01	9,21	n.s.

Table 3  
Correlations of the Personality Factors with Task Performance  
of Groups Led by Male and Female Leaders

<u>Personality</u>	<u>Male Leaders</u>		<u>Female Leaders</u>		
	<u>Factors</u>	<u>Drawing</u>	<u>Proposal</u>	<u>Drawing</u>	<u>Proposal</u>
AWS		.03	-.20	-.07	.01
Total LPC		-.10	.05	-.03	-.30 <sup>+</sup>
ANDRF		-.10	-.48*	-.06	.19
ANDRM		.12	-.16	-.13	-.24
ROTTER		.08	-.09	.21	-.07
SATMATH		-.05	-.18	-.36 <sup>*a</sup>	.12
SATVERB		-.08	-.01	-.29	.14
Self-Concept		.08	.10	-.18	-.19
MP		-.03	-.01	-.11	-.13
Drawing		--	-.05	--	-.02
Proposal		-.05	--	-.02	--

\*p < .05      +p < .06

<sup>a</sup>The relationship between SATMATH and group performance on the drawing task was analyzed and discussed at length in a previous report dealing with a screen model analysis (Fiedler & Leister, 1977) of the relationship between leader intelligence and group performance (Yoder, Rice & Adams, 1979).

Note: The variable name abbreviations used in this report conform to those used in previous U.S.M.A. Office of Institutional Research technical reports dealing with these variables.